

FORESTRY SCIENCE IN THE SERVICE OF MAN



Number 15

FOREST SERVICE RESEARCH FINDS WAYS TO-----

----- Revegetate strip-mined land

A few years ago the best advice for revegetating an area disturbed by surface mining was to plant trees immediately. Today the advice is to first stabilize spoiled lands, then try to curb erosion by planting legumes and grasses that hold soil on the site. In the second wave of action, plant trees.

The recommended three steps to surface-mine revegetation--fertilizing, grass and legume seeding, and tree planting--resulted from the intensive and growing research effort in West Virginia by many scientists from federal and state agencies and West Virginia University. Their expressed goal is to minimize the effect surface mining may have on other natural resources, and to return disturbed lands to some productive use quickly.



According to Bill Plass, a Forest Service researcher, "The emphasis in revegetation programs continues to shift. Today the emphasis is on stopping erosion, site protection, and esthetics. Tomorrow, site protection will still be important; but more emphasis will be placed on using vegetation which will provide tangible economic returns." In addition, Plass believes that "detailed land management plans will be prepared for many areas disturbed by surface mining."

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RECLAMATION RESEARCH

Plass is a member of the Northeastern Forest Experiment Station mined area reclamation research project, which is conducting research in West Virginia, Kentucky, and Pennsylvania. Plass has been dealing with the specific reclamation problems of West Virginia surface-mined areas since the fall of 1968.

The Forest Service researchers maintain a diversified research program. Although water quality and sedimentation research have high priority in the research effort, studies on revegetation for erosion control, stabilization, and aesthetics are equally essential.

Scientists have shown that an acceptable ground cover can be established on most surface-mine spoils. Now they are concentrating on a few problem spoils, faster vegetation establishment, and the development of management techniques to achieve an economic return equal to or greater than that realized by each acre of land before mining.

When the Forest Service research team first came to West Virginia, they surveyed the spoils in the southern coalfield. This survey was needed because there had been little documented information on West Virginia spoils. In this survey, spoil samples were collected from 39 different mining operations. These were examined in the laboratory and greenhouse to determine chemical characteristics and plant nutrient availability.

Acidity was one factor considered. Spoil acidity often indicates the presence of toxic chemicals that can affect plant survival and growth. There is also danger of stream pollution from highly acidic spoils. Survey results indicate no serious acidity problems. Furthermore, indications are that little or no difficulty should be experienced in establishing vegetation on three-fourths of southern West Virginia spoils. Once they are fertilized, these spoils can be seeded and planted to a wide variety of plant materials. The better spoils under proper management are capable of supporting crops of high economic value.

Greenhouse tests indicate that spoil fertility more than acidity determines how well plants establish and grow. This is fortunate since fertility can easily be corrected with addition of the proper nutritional elements. In nearly all cases, there was a shortage of nitrogen and phosphorus.

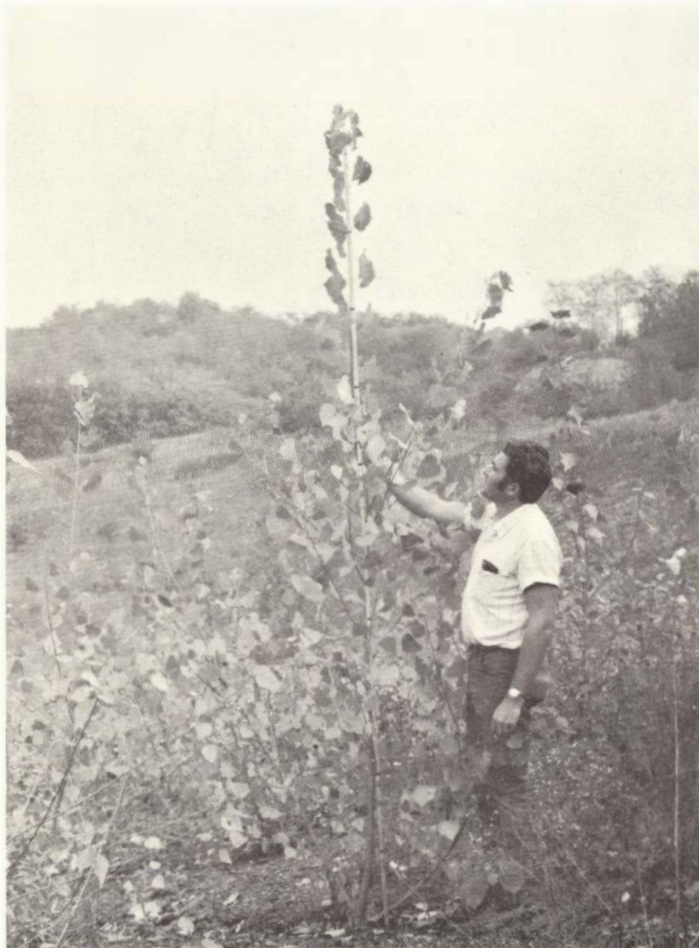
This research shows that the best long-range revegetation begins with fertilization of the area to be reclaimed. Once fertilized, an area can be seeded with grasses and legumes 9 months out of the year. On steep slopes this should be followed as soon as possible by the planting or seeding of trees, since they provide more permanent site protection.

HYBRID POPLAR STUDY

One of the first field trials established by the scientists was a test planting of hybrid poplar selections to see how rapidly the land can be returned to timber production.

Hybrid poplars belong to the cottonwood family. Genetically improved strains have been produced to grow rapidly on the better spoils. Instead of planting seedling trees, hybrid poplars are planted as unrooted cuttings. Roots and leaves develop after the cutting has been placed in the ground.

On sites in Monongalia and McDowell Counties after three growing seasons, several of the selections averaged over 10 feet tall, and some of the trees measured over 20 feet tall. The results from these tests indicate hybrid poplars can be used on many West Virginia spoils. Other sites in Monongalia, Grant, Raleigh, Boone, and Randolph Counties will determine where hybrid poplars will grow best and how rapidly they will produce a timber product.



Hybrid poplars grow rapidly on many West Virginia surface-mine spoils. This tree is three years old and over 12 feet tall.



Helicopters have been used to seed and fertilize thousands of acres of surface-mined land in West Virginia. It is a fast and efficient method to revegetate steep mountain slopes.

The researchers are constantly trying new varieties of grasses and legumes. Working in cooperation with the Soil Conservation Service which develops the varieties, the Forest Service researchers evaluate the grasses and legumes to determine their suitability for providing a protective ground cover on spoil banks in West Virginia. They are particularly interested in grasses and legumes that will survive the severe climates at high elevations.

Because there is a wide variation between spoils, and important climatic differences throughout West Virginia, these studies are located in Preston, Monongalia, Kanawha, Grant, Randolph, and McDowell Counties.

Species of grasses, legumes, trees, and shrubs that will provide year-round food source for wildlife are being tested -- "In many places, openings created by surface mining will provide valuable wildlife food areas if selected wildlife food plants are seeded or planted," Plass states.

Putting strip-mined land back into productive use is a continuing challenge to the Forest Service researcher. As Plass points out, "Today's standards for reclamation may not be acceptable tomorrow. Therefore, we must test and perfect new ideas. These may not appear practical today, but they may be our answers tomorrow."